

**REMARKS**

By this amendment, claims 1-104 are pending, in which claims 1, 6, 16, 20, 27, 31, 33, 37, 38, 40, 47, 49, 57-58, 60, 61, 68, 73, 82, 87, 94, 98, 100, and 104 are currently amended, and no claims are canceled, newly presented or withdrawn from consideration. No new matter is introduced.

The Office Action mailed November 25, 2003 objected to claim 38 and rejected claims 85-86 and 89-90 under 35 U.S.C. § 112, ¶ 2 as indefinite, claims 1, 2, 16-19, 38-43, 45, 46, 60-64, 66-69, and 82-86 under 35 U.S.C. § 102(b) as anticipated by *Gerstel et al.* (U.S. 5,867,289), claims 3 and 70 under 35 U.S.C. § 103(a) as obvious over *Gerstel et al.*, claims 20-26, 49-52, and 87-93 under 35 U.S.C. § 103(a) as obvious over *Gerstel et al.* in view of commonly assigned *Fee* (U.S. 6,108,113), claims 4-15, 47, 48, 65, and 71-81 under 35 U.S.C. § 103(a) as obvious over *Gerstel et al.* in view of *Shiragaki* (U.S. 5,457,556), claims 27-30, 44, and 94-97 under 35 U.S.C. § 103(a) as obvious over *Gerstel et al.* in view of *Fatehi et al.* (U.S. 5,892,606), and claims 35, 36, 102, and 103 under 35 U.S.C. § 103(a) as obvious over *Gerstel et al.* in view of *Fatehi et al.*, and further in view of *Shiragaki*.

Claims 53-59 were allowed, and claims 31-34, 37, 98-101, and 104 were objected to as being dependent upon a rejected base claim, but were indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants acknowledge with gratitude the indication by the Examiner of allowed claims and allowable subject matter.

Claims 31, 33, 37, 98, 100, and 104 have been amended to include all limitations of their respective base claims and any respective intervening claims as suggested by the Office Action, and thus claims 31-34, 37, 98-101, and 104 are allowable.

Claims 7, 57, 58, 62-64, and 69 have been amended in view of noted informalities.

Applicants respectfully traverse the rejection of claims 1-30, 35-36, 38-97, and 102-103 as follows.

Responsive to the "Claim Objections" stated on page 2 of the Office Action, claim 38 has been amended as required by the Office Action.

Regarding the indefiniteness rejection of claims 85, 86, 89, and 90 under 35 U.S.C. § 112, ¶ 2, each of these claims has been amended to recite "the supplemental signal means." No new matter is added (See, e.g., specification, page 25, pars. 77 and 78). Applicants thus respectfully request the withdrawal of the indefiniteness rejection of claims 85, 86, 89, and 90.

Independent claims 1, 6, 16, 20, 27, 38, 40, 47, 49, 60, 61, 68, 73, 82, 87, and 94 have been amended to advance prosecution, as discussed below. Amended independent claims 1, 6, 16, 49, 73, and 82 recite "the supplemental signal includes a modulation applied to the optical signal." Amended independent claims 20, 27, 87, and 94 recite "the first supplemental signal includes a modulation applied to the optical signal." Amended independent claims 60 and 61 recite "the one supplemental signal includes a modulation applied to the one optical signal." Amended independent claim 68 recites "the one supplemental signal includes a modulation applied to the optical signal." Amended independent claims 38 and 40 recite "at least one attribute of known value conveyed by a component of the one optical signal." Amended independent claim 47 recites "at least one optical signal having at least one detectable attribute, wherein the detectable attribute is associated with a modulation applied to the optical signal."

Care was exercised to introduce no new matter by these amendments. (See, e.g., specification, page 15, ¶ 45, page 16, ¶ 48, page 18, ¶ 54)

In support of its rejection of claim 1 the Office Action (page 2), applies *Gerstel et al.*, citing Figure 2, col. 3, lines 37-42 and col. 4, lines 6-39. *Gerstel et al.*, at col. 4, lines 6-39, states:

The following discussion details the preferred embodiment of the invention in which the exemplary embodiment includes optical channels operating with a nominal wavelength of 1.5  $\mu\text{m}$  and supervisory signals of 1.3  $\mu\text{m}$ . However, it is contemplated that the process and method of the present invention can be extended to any optical network system employing WDM techniques at other wavelengths in which the supervisory signal has a different wavelength than that of the optical channel signals.

Generation of supervisory signals of one embodiment of the present invention at 1.3  $\mu\text{m}$  is either accomplished by a Driver 201 and Light Source 202, which can be a broadband high-power light source (such as SLDs) or a tunable laser, and is located at the input port of the demultiplexer 203. Other wavelengths may be used for the supervisory signals. **The exemplary optical signals at 1.3  $\mu\text{m}$  are subsequently combined with the input signal** to the input port of the wavelength demultiplexer 203. When a broadband light source is used, the optical signals are spliced by the wavelength demultiplexer and thus be present at all of the output wavelength demultiplexer. The splicing of the optical signals in accordance with one exemplary embodiment of the present invention allows the generation of the supervisory signals for all of the lightpaths at once. In an alternative embodiment, the optical paths are scanned by a tunable laser operating at 1.3  $\mu\text{m}$ . The supervisory channel uses a wavelength other than 1.5  $\mu\text{m}$  in order to avoid interfering with signals transmitted at 1.5  $\mu\text{m}$ .

The wavemeter 210 monitors the supervisory channel, which is tapped off from the output port of the wavelength multiplexer using the device shown in 209, and displays the optical power of each supervisory channel present in each individual wavelength signal simultaneously.

This passage was cited in support of the Office Action's contention that the "supplemental signal" recited by claim 1 was met by *Gerstel et al.* However, amended independent claim 1 now recites "wherein the supplemental signal includes a modulation applied to the optical signal," which is a feature neither disclosed nor suggested by *Gerstel et al.* Similarly, amended independent claims 16 and 82 recite "wherein the supplemental signal includes a modulation applied to the optical signal," which is neither disclosed nor suggested by *Gerstel et al.*

According to the Office Action on pages 7-8, the "supplemental signal" recited by originally filed claims 60 and 61 is met by the driver 201 and light source 202 of *Gerstel et al.*

However, amended independent claims 60 and 61 each recite "the one supplemental signal includes a modulation applied to the one optical signal," which is neither disclosed nor suggested by *Gerstel et al.*

In support of its rejection of claim 68 the Office Action (pages 9-10), applies *Gerstel et al.*, citing col. 5, lines 12-34 and col. 7, lines 9-11. *Gerstel et al.*, at col. 5, lines 12-34, states:

FIG. 5 illustrates monitoring of bypass optical paths. The bypass lightpaths, such as the one indicated by the dashed path 502, are monitored by detecting the 1.3  $\mu\text{m}$  light 501 at the wavemeter 210. There are a total of  $2N$  lightpaths in FIG. 5 which are monitored. A supervisory monitoring channel is present in each of the lightpaths. This supervisory channel for each of the lightpaths is generated at 202, as described in accordance with embodiment shown in FIG. 2. The  $2N$  supervisory channels are combined by the two wavelength multiplexers and monitored by the wavelength meters. The presence of such a supervisory channel on the wavelength meter indicates that the corresponding lightpath is connected. The missing of any one or more of the wavelengths indicate the malfunction of the lightpaths. Note that this method might not be able to locate the specific switch element that is malfunctioned. As an example, the missing of the supervisory channel 501 for the lightpath 502 could indicate the malfunction of the wavelength demux, or one of the switch components in the switch module responsible for  $\lambda_1$ , or the wavelength multiplexer. The capability to detect the exact location within a switch module, however, is less important as the whole switch module usually needs to be replaced and repaired as a single entity.

In contrast, amended independent claim 68 recites "the one supplemental signal includes a modulation applied to the optical signal," which is neither disclosed nor suggested by *Gerstel et al.*

In support of its rejection of claim 38, the Office Action (page 5) applies *Gerstel et al.*, citing Figure 2, incoming line 106, wavemeter 210, comparator 646, col. 5, lines 12-34, and col. 7, lines 9-11. The Office Action relies on the incoming line 106 as anticipating "at least one optical signal having at least one attribute of known value." Similarly, the Office Action (pages 5-6) relies on the incoming line 106 as anticipating "at least one optical signal having at least one attribute of known value" as recited by amended independent claim 40. However, *Gerstel et al.*

does not disclose or suggest "at least one attribute of known value conveyed by a component of the one optical signal," as recited by either of amended independent claims 38 or 40.

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed in a prior art reference, based on the foregoing, Applicants respectfully submit that *Gerstel et al.* fails to anticipate amended independent claims 1, 16, 38, 40, 60, 61, 68, and 82.

The rejection of dependent claims 2, 17-19, 39, 41-43, 45, 46, 62-64, 66-67, 69, and 83-86 should be withdrawn for at least the same reasons as their respective independent claims, and these claims are separately patentable on their own merits.

Regarding the obviousness rejection of dependent claims 3 and 70, Applicants respectfully submit that the rejection of these claims should be withdrawn for at least the same reasons as their respective independent claims, and these claims are separately patentable on their own merits.

Turning attention to the obviousness rejection of independent claims 20 and 87, the Office Action (page 13) states:

Gerstel et al. does not specifically disclose that the optical signal has an associated other (i.e., first) supplemental signal originating outside of the optical switch.

However, Fee teaches that a signal in an optical network may include an associated supplemental signal (Figure 9 shows how an ancillary data 905 can be introduced as a first supplemental signal to an optical signal). Fee further discloses that his first supplemental signal may be used to provide many types of supplemental information as desired (column 13, lines 29-60). Regarding claims 20 and 87, it would have been obvious to a person of ordinary skill in the art to include a first supplemental signal as taught by Fee in the system disclosed by Gerstel et al. in order to include further supplemental information in the signal as desired while providing a second supplemental signal specifically for monitoring the operation of the switch (as disclosed by Gerstel et al.).

However, amended independent claims 20 and 87 each recite "the first supplemental signal includes a modulation applied to the optical signal." *Gerstel et al.* (Per Abstract) states,

"The supervisory channels are monitored by a wavemeter for bypass lightpaths and dropped lightpaths. Added optical channels are monitored by monitoring a portion of the signal power in the added lightpath of the added optical channel. **If the wavemeter detects the absence of the supervisory signal, or the portion of the added optical channel, this indicates a fault condition** and the network control is notified to effect correction of the fault." Applicants respectfully submit that *Gerstel et al.* thus teaches **away** from including signals as taught by *Fee* in the system of *Gerstel et al.*, as the system specifically detects the **absence** of the supervisory channel and the missing of any one or more lightpaths (e.g., col. 5, lines 12-34). Thus, *Gerstel et al.* in view of *Fee* neither discloses nor suggests the features recited by amended independent claims 20 and 87.

For reasons similar to those discussed above with regard to claims 20 and 87, Applicants submit that the features recited by amended independent claim 49 are neither disclosed nor suggested by *Gerstel et al.* in view of *Fee*. Thus, the rejection of claims 20, 49, and 87 should be withdrawn.

The rejection of dependent claims 21-26, 50-52, and 88-93 should be withdrawn for at least the same reasons as their respective independent claims, and these claims are separately patentable on their own merits.

In support of its obviousness rejection of claims 6 and 73, the Office Action (page 18), applies *Gerstel et al.*, and then relies on *Shiragaki* for including "another supplemental signal detector in the system disclosed by *Gerstel et al.*" However, amended independent claims 6 and 73 each recite "the supplemental signal includes a modulation applied to the optical signal," which is neither disclosed nor suggested by either of *Gerstel et al.* nor *Shiragaki*, nor by any reasonable combination thereof.

In support of its obviousness rejection of claim 47, the Office Action (page 23), applies *Gerstel et al.*, and then relies on *Shiragaki* for "detecting values of a signal on both sides of an optical switch." However, amended independent claim 47 recites "at least one optical signal having at least one detectable attribute, wherein the detectable attribute is associated with a modulation applied to the optical signal," which is neither disclosed nor suggested by either of *Gerstel et al.* nor *Shiragaki*, nor by any reasonable combination thereof. Thus, the rejection of claims 6, 47, and 73 should be withdrawn.

For similar reasons, *Shiragaki* does not cure the deficiencies of *Gerstel et al.* with regard to dependent claims 4-5, 65, and 71-72. Thus, the rejection of dependent claims 4-5, 7-15, 48, 65, 71-72, and 74-81 should be withdrawn for at least the same reasons as their respective independent claims, and these claims are separately patentable on their own merits.

In support of its obviousness rejection of claims 27 and 94, the Office Action (page 25), applies *Gerstel et al.*, and then relies on *Fatehi et al.* for disclosing that "signals may be modified during transmission (Figure 2; column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system." However, amended independent claims 27 and 94 each recite "the first supplemental signal includes a modulation applied to the optical signal." *Gerstel et al.* (Per Abstract) states, "The supervisory channels are monitored by a wavemeter for bypass lightpaths and dropped lightpaths. Added optical channels are monitored by monitoring a portion of the signal power in the added lightpath of the added optical channel. **If the wavemeter detects the absence of the supervisory signal, or the portion of the added optical channel, this indicates a fault condition** and the network control is notified to effect correction of the fault." Applicants respectfully submit that *Gerstel et al.* thus teaches **away** from including features of *Fatehi et al.* in the system of *Gerstel et al.*, as the system specifically detects the **absence** of the supervisory channel and the missing of any one or more lightpaths (e.g., col. 5,

lines 12-34). Thus, *Gerstel et al.* in view of *Fatehi et al.* neither discloses nor suggests the features recited by amended independent claims 27 and 94. Thus, the rejection of claims 27 and 94 should be withdrawn.

For similar reasons, *Fatehi et al.* does not cure the deficiencies of *Gerstel et al.* with regard to dependent claim 44. Thus, the rejection of dependent claims 28-30, 44, and 95-97 should be withdrawn for at least the same reasons as their respective independent claims, and these claims are separately patentable on their own merits.

In support of its obviousness rejection of dependent claims 35 and 102, the Office Action (pages 27-28) applies *Gerstel et al.* in view of *Fatehi et al.*, relying on its rejection of claims 27 and 94, relying further on *Shiragaki* for "detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal." However, *Shiragaki* does not fill in the gaps discussed previously with regard to the rejection of claims 27 and 94, and nor does any reasonable combination of *Gerstel et al.* in view of *Fatehi et al.*, and further in view of *Shiragaki*. Further, the "well understood" reasoning applied by the Office Action (page 28) to the features recited by claims 36 and 103 do not fill in the gaps discussed previously with regard to the respective independent claims from which claims 36 and 103 depend. Thus, the rejection of claims 35, 36, 102, and 103 should be withdrawn.



Therefore, the present application, as amended, overcomes the objections and rejections of record and is in condition for allowance. Favorable consideration is respectfully requested. If any unresolved issues remain, it is respectfully requested that the Examiner telephone the undersigned attorney at (703) 425-6499 so that such issues may be resolved as expeditiously as possible.

Respectfully Submitted,

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